

Box #1

CHEM ENGR

MAY 1948 VOL 55 #5

TO + INCLUDING MAR 1949

VOL 56 #3 EXCEPT

DEC 1948 VOL 55 #12

Box 2

CHEM. ENGR,

MAY 1949 TO

JULY 1949

Nov 1949

Fluid Measure

$$1 \text{ minim} = 0.06161 \text{ cm}^3$$

$$60 \text{ minims} = 1 \text{ fluid drachm} = 3.696 \text{ cm}^3$$

$$8 \text{ fluid drachms} = 1 \text{ fl oz.} = 29.573 \text{ cm}^3$$

$$16 \text{ fl oz} = 1 \text{ fl. pt. U.S.} = 473.18 \text{ cm}^3$$

$$2 \text{ pints} = 1 \text{ qt U.S.} = 946.36 \text{ cm}^3$$

$$8 \text{ pints} = 4 \text{ qts} = 1 \text{ gal} = 3.785 \text{ liters}$$

U.S. gal contains 231 cu in and weighs when full of water 8.64 #

LENGTH

in	ft.	YD.	ROD	FURLONG	STA. MILE
12	1				
36	3	1			
198	16½	5½	1		
7,920	660	220	40	1	
63,360	5,280	1,760	320	8	1
190,080	15,840	5,280	960	24	3
1	½	$\frac{1}{36}$	$\frac{1}{198}$	$\frac{1}{7920}$	$\frac{1}{63,360}$

1 ft. = 30. 4800 6096 (legal)

1 cm = 0. 03280833

1 m = 39. 37 exact legal

TABLES

METRIC LENGTH

$$10 \text{ \AA ngstrom units (A.)} = 1 \text{ millimicron}^{(1 \text{ m}\mu)} = \frac{1}{1000} \text{ micron}(1 \mu) = \frac{1}{1,000,000} \text{ millimeter (mm)}$$

$$10 \text{ A} = 1 \text{ m}\mu$$

$$1000 \text{ m}\mu = 1 \mu$$

$$1000 \mu = 1 \text{ mm}$$

$$10 \text{ mm} = 1 \text{ cm}$$

$$10 \text{ cm} = 1 \text{ dm}$$

$$100 \text{ cm or } 1000 \text{ mm} = 1 \text{ meter}$$

$$10 \text{ meters} = 1 \text{ Dekameter}$$

$$1000 \text{ meters} = 1 \text{ Kilometer} \quad 10 \text{ Dekameters} = 1 \text{ Hectometer}$$

$$10 \text{ Kilometers} = 1 \text{ Myriameter}$$

$$1 \text{ mm} = 1000 \text{ microns}$$

$$1 \text{ Km} = 0.62137 \text{ mi} = 3,280 \text{ ft} / 10 \text{ in.}$$

$$1 \text{ m} = 39.37 \text{ in} = 3.28 \text{ ft.}$$

ENGLISH LENGTH TABLE

$12 \text{ in} = 1 \text{ ft.}$
 $3 \text{ ft} = 1 \text{ yd.}$
 $5 \frac{1}{2} \text{ yds} = 1 \text{ rod}$
 $40 \text{ rods} = 1 \text{ furlong}$
 $8 \text{ furlongs} = 1 \text{ sta. mile}$
 $3 \text{ miles} = 1 \text{ league}$

$1 \text{ mile} = 1.60935 \text{ Km.}$
 $1 \text{ yd} = .91440 \text{ meters}$
 $1 \text{ foot} = 30.4801 \text{ cm}$
 $1 \text{ in} = 2.5400 \text{ cm}$
 $1 \text{ nautical mile} = 1.152 \text{ land miles}$

Capacity

$$10 \text{ milliliters} = 1 \text{ centiliter} = 10 \text{ cm}^3$$

$$10 \text{ centiliters} = 1 \text{ Deciliter}$$

$$10 \text{ deciliters} = 1 \text{ liter} = 1 \text{ cu decimeter}$$

$$10 \text{ liters} = 1 \text{ Dekaliter}$$

$$10 \text{ dekiliters} = 1 \text{ Hectoliter}$$

$$10 \text{ Hectoliters} = 1 \text{ Kiloliter or Stere} = 1 \text{ cu meter} = 1.308 \text{ cu yds}^3 = 264.17 \text{ gal}$$

$$1 \text{ ml} = 0.061 \text{ cu in} = .27 \text{ fluid dram}$$

Equivalent

$$\text{Dry measure Liquid} \\ = .6102 \text{ cu in} = .338 \text{ fluid oz}$$

$$= 6.102 \text{ cu in} = .895 \text{ gill}$$

$$= .908 \text{ qt.} = 1.0567 \text{ qts}$$

$$= 9.08 \text{ qts} = 2.6417 \text{ gals}$$

$$= 2 \text{ bu } 3.35 \text{ pks} = 26.417 \text{ gal}$$

Liquid

4 galls = 1 pint

3 pints = 1 qt

4 qts = 1 gal

$31\frac{1}{2}$ gals = 1 barrel (W)

2 barrels = 1 hoghead (Hhd.)

1 hog hd = 2 Hhd =

63 gal = 252 qt =

504 qt = 2,016 gi

1 cu in = 16.387 cc

1 cu ft = 0.02832 cu meter

1 cu yd = .76456 cu meter

1 qt = 0.94633 liter

1 gal = 3.78533 liters

1 cu yd = 27 cu ft = 46,656 cu in.

Dry

2 pints = 1 qt

8 qts = 1 peck

4 pecks = 1 bushel

36 bushels = 1 chaldron

Cubic

1,728 cu in = 1 cu ft. = $\frac{4}{5}$ bushel

27 cu ft = 1 cu yd.

128 cu ft = 1 cord (wood)

40 cu ft = 1 ton (shipping)

2,150.42 cu in = 1 standard bushel

231 cu in = 1 standard gallon

Surface - Area

$$1 \text{ m}^2 = 1 \text{ centare} \quad 1,550 \text{ sq. in}$$

$$100 \text{ m}^2 = 1 \text{ are} \quad = ~~119~~ 119.6 \text{ sq. yds}$$

$$10,000 \text{ m}^2 = 1 \text{ Hectare} = 2.471 \text{ acres}$$

$$1 \text{ Sq. mi} = 640 \text{ A.} = 102,400 \text{ Sq. rd.} = 3,097,600 \text{ Sq. yd.} = 27,878,400 \text{ sq. ft.} = 4,014,489,600 \text{ sq. in}$$

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144 sq in = 1 sq ft

9 sq ft = 1 sq yd

30 1/4 sq yds = 1 sq rod

40 sq rods = 1 wood

160 sq yds or 4 woods = 1 acre or 160

640 acres = 1 sq mile

MAR 13 1946

MAR 13 1946

MAR 14 1946

MAR 15 1946

0.001 milligram = 1 microgram (often called 1 gamma)

	Mass	Avoirdupois
milligram	$1 \text{ mm}^3 \text{ H}_2\text{O}$.0154 grain
10 milligrams = 1 centigram	100 mm^3	0.1543 grain
10 centigrams = 1 Decigram	$\frac{1}{10} \text{ cc}$	1.5432 grains
10 Decigrams = 1 Gram	1 cc	15.432 grains
10 grams = 1 Dekagram	10 cc	154.32 grains
10 Dekagrams = 1 Hectogram	1 deciliter	3.5274 ounces
10 Hectograms = 1 Kilogram	1 liter	2.2046 pounds
10 Kilograms = 1 Myriagram	10 liters	22.046 pounds
10 Myriagrams = 1 Quintal	1 hectoliter	220.46 pounds
10 Quintals = 1 Million or Tonneau	1000 liters	2,204.6 pounds

$$1 \text{ Kg} = 2,204,622.341 \text{ lbs}$$

$$1 \text{ lb} = 0.453,592,4277 \text{ kg}$$

$$16 \text{ oz} = 1 \text{ lb}$$

$$100 \text{ lb} = 1 \text{ cwt}$$

$$20 \text{ cwt} = 1 \text{ ton}$$

$$1 \text{ T} = 20 \text{ cwt} = 2,000 \text{ lb} = 32,000 \text{ oz}$$

From wt.

$$27 \text{ grains (gr)} = 1 \text{ pennyweight (pwt)}$$

$$20 \text{ pwt} = 1 \text{ oz}$$

$$12 \text{ oz} = 1 \text{ lb}$$

$$1 \text{ lb} = 12 \text{ oz} = 240 \text{ pwt} = 5,760 \text{ gr}$$

$$1 \text{ pound} = 453.59 \text{ grams}$$

$$1 \text{ oz} = 28.3495 \text{ grams}$$

UNITS OF LENGTH

UNITS	INCHES	LINKS	FEET	YARDS	MILES	Centimeter	METERS
1 inch =	1	0.126263	0.083333	0.027778	0.000016	2.540	0.025400
1 link =	7.92	1	0.66	0.22	0.000125	20.117	0.201168
1 foot =	12	1.515152	1	0.333333	0.000189	30.480	0.304801
1 Yard =	36	4.54545	3	1	0.000568	91.440	0.914402
1 rod =	198	25	16.5	5.5	0.003125	502.921	5.029210
1 chain =	792	100	66	22	0.0125	2011.684	20.11684
1 mile =	63,360	8000	5280	1760	1	160934.72	1609.3472
1 cm. =	0.3937	0.049710	0.032808	0.010936	0.000006	1	0.01
1 Meter =	39.37	4.970960	3.280833	1.093611	0.000621	100	1

COMPARISON OF METRIC AND CUSTOMARY UNITS FROM 1 TO 9

INCHES IN.	MILLIMETER MM	FEET (ft.)	METERS (M)	YARDS (Yd.)	METERS (M)	U.S. MILES (mi)
0.03937 = 1		3.28083 = 1		1.093611 = 1		0.621370 = 1.6213699495
0.07874 = 2		6.56167 = 2		2.187222 = 2		1.242740 = 2
0.11811 = 3		9.84250 = 3		3.280833 = 3		1.864110 = 3
0.15748 = 4		13.12333 = 4		4.374444 = 4		2.485480 = 4
0.19685 = 5		16.40417 = 5		5.468056 = 5		3.106850 = 5
0.23622 = 6		19.68500 = 6		6.561667 = 6		3.728220 = 6
0.27559 = 7		22.96583 = 7		7.655278 = 7		4.349590 = 7
0.31496 = 8		26.24667 = 8		8.748889 = 8		4.970960 = 8
0.35433 = 9		29.52750 = 9		9.842500 = 9		5.592330 = 9
1 = 25.4001		1 = 0.304801		1 = 0.914402		1 = 1.609347
2 = 50.8001		2 = 0.609601		2 = 1.828804		2 = 3.218694
3 = 76.2002		3 = 0.914402		3 = 2.743205		3 = 4.828042
4 = 101.6002		4 = 1.219202		4 = 3.657607		4 = 6.437389
5 = 127.0003		5 = 1.524003		5 = 4.572009		5 = 8.046736
6 = 152.4003		6 = 1.828804		6 = 5.486411		6 = 9.656083
7 = 177.8004		7 = 2.133604		7 = 6.400813		7 = 11.265431
8 = 203.2204		8 = 2.438405		8 = 7.315215		8 = 12.874778
9 = 228.6005		9 = 2.743205		9 = 8.229616		9 = 14.484125

Frasco.....	Argentine Republic	2.5098 liq. qts.	Tchetvert.....	Russia.....	5.96 bu.
".....	Mexico.....	2.5 liq. qts.	To.....	Japan.....	2.05 pecks.
Frasila.....	Zanzibar.....	35 lbs.	Ton.....	Space measure.....	40 cu. ft.
Fuder.....	Luxemburg.....	264.18 gals.	Tonde ce'als.....	Denmark.....	3.9480 bu.
Funt.....	Russia.....	0.9028 lb.	Tonde Land.....	".....	1.36 acres.
Gallon.....	British Empire.....	1.20094 U. S. gal.	Tonne.....	France.....	2204.62 lbs.
Garnice.....	Poland.....	1.0567 gal.	Tsubo.....	Japan.....	35.58 sq. ft.
Gram.....	Metric.....	15.432 grains.	Tsun.....	China.....	1.26 inches.
Hectare.....	".....	2.471 acres	Tunna (wheat).....	Sweden.....	4.5 bu.
Hectolitre.....	".....	".....	Tuanland.....	".....	1.22 acres.
" Dry.....	".....	2.838 bu.	Vara.....	Argentine Republic.....	34.0944 inches
" Liquid.....	".....	26.418 gals.	".....	Costa Rica, Salv'd'r.....	32.913 inches.
Jarib.....	Persia (New).....	2.471 acres.	".....	Guatemala.....	32.909 inches.
Joch.....	Austria (Germany).....	1.422 acres.	".....	Honduras.....	32.953 inches.
".....	Hungary.....	1.067 acres.	".....	Nicaragua.....	33.057 inches.
Ken.....	Japan.....	5.97 feet.	".....	Chile and Peru.....	32.913 inches.
Kil'g'am kilo.....	Metric.....	2.2046 lbs.	".....	Cuba.....	33.386 inches.
Kilometre.....	".....	0.62137 mile.	".....	Mexico.....	32.992 inches.
Klafter.....	Austria (Germany).....	2.074 yds.	Vedro.....	Russia.....	2.707 gals.
Koku.....	Japan.....	5.119 bu.	Verst.....	".....	0.663 mile.
Kwamme.....	Japan.....	8.2673 lbs.	Vloka.....	Poland.....	41.50 acres.
Last.....	Belgium, Holland.....	85.134 bu.	Wey.....	Scotland & Ireland.....	41.282 bu.

The metric carat of 200 milligrams is now very generally in use. The word also is used to denote the proportion of alloy in a metal. Thus, pure gold is 24 carats fine.

Barrel.....	and Mexico.....	20.0787 gals.	Litre.....	Metric.....	1.0567 liq. qts.
Berkovets.....	Malta (customs).....	11.2 gals.	".....	Metric.....	0.90810 dry qts.
Bongkal.....	Russia.....	361.128 lbs.	Livre (lb.).....	Greece.....	1.1 lbs.
Bouw.....	Fed. Malay States.....	832 grains	".....	Guiana (Dutch).....	1.089 lbs.
Bu.....	Somatra.....	7.096.5 sq. metrs.	Load, timber.....	England.....	50 cu. ft.
Bushel.....	Japan.....	0.12 inch.	Lumber (std.).....	in Europe.....	165 cu. ft., or 1.980 ft. b. m.
Cattiso.....	British Empire.....	1.03205 U. S. bu.	Manzana.....	Nicaragua.....	1.742 acres.
Candy.....	Malta.....	5.40 gals.	".....	Costa Rica, Salv'd'r.....	1.727 acres.
".....	India (Bombay).....	589 lbs.	Marc.....	Bolivia.....	0.507 lb.
".....	India (Madras).....	500 lbs.			

Centar	Egypt	55.05 lbs.
"	Morocco	112 lbs.
"	Turkey	124.45 lbs.
Centaro	Malta	175 lbs.
Cent. Metric	World	3,086 grains
Catty	China	1.333 $\frac{1}{3}$ lbs.
"	Japan	1.32 lbs.
"	Java, Malacca	1.36 lbs.
"	Siam	2 $\frac{1}{2}$ lbs.
" (stand)	Siam	1.32 lbs.
"	Sumatra	2.12 lbs.
Centaro	Central America	4.2631 gals.
Centner	Brunswick	117.5 lbs.
"	Bremen	127.5 lbs.
"	Denmark, Norway	110.23 lbs.
"	Prussia	113.44 lbs.
"	Sweden	93.7 lbs.
"	Double or metric	220.46 lbs.
Chetvert	Russia	5.957 bu.
Ch'lh	China	12.60 inches.
" (metric)	China	1 meter.
Cho	Japan	2.451 acres.
Comb	England	4.1282 bu.
Coyan	Siam	2,645.5 lbs.
Cuadra	Argentine Republic	4.2 acres.
"	Paraguay	94.70 yds.
" (sq.)	Paraguay	1.85 acres.
"	Uruguay	1.82 acres.
Cubic meter	Metric	35.3 cu. ft.
Cwt. (hund. weight)	British	112 lbs.
Dessiatine	Russia	2.6997 acres.
Dr'e'ma (new)	Greece	15.43 gr., or 1 grm.
Fanega (dry)	Ecuador, Salvador	1.5745 bu.
"	Chile	2.75268 bu.
"	Guatemala, Spain	1.53 bu.
"	Mexico	2.57716 bu.
" (double)	Uruguay	7.776 bu.
" (single)	Uruguay	3.888 bu.
"	Venezuela	3.334 bu.
" (liquid)	Spain	16 gals.
Feddan	Egypt	1.04 acres.
Grall (rals's)	Spain	50 lbs.

Maana	Metric	32.27 lbs.
Metre	Metric	39.37 inches.
Mil	Denmark	4.68 miles.
(geographic)	Denmark	4.61 miles.
Milla	Nicaragua	1.1594 miles.
"	Honduras	1.1493 miles.
Mina (old)	Greece	2.202 lbs.
Morgen	Prussia	0.63 acre.
Oke	Egypt	2.8052 lbs.
" (Ocque)	Greece	2.82 lbs.
"	Turkey	2.828 lbs.
Pic	Egypt	22.83 inches.
Picul	Borneo & Celebes	135.64 lbs.
"	China	133 $\frac{1}{2}$ lbs.
"	Java	136.16 lbs.
"	Philippine Islands	139.44 lbs.
Pie	Argentine Republic	0.94708 foot.
"	Spain	0.91416 foot.
Pik	Turkey	27.9 inches.
Pood	Russia	36.113 lbs.
Pund (lb.)	Denmark	1.102 lbs.
Quart	British Empire	1.20094 liq. qt.
"	"	1.03205 dry qt.
Quarter	Great Britain	8.256 bu.
Quintal	Argentine Republic	101.28 lbs.
"	Brazil	129.54 lbs.
"	Castile, Peru	101.43 lbs.
"	Chile	101.41 lbs.
"	Mexico	101.47 lbs.
"	Metric	220.46 lbs.
Rottle	Palestine (south)	6.35 lbs.
Sack (flour)	England	280 lbs.
Sagene	Russia	7 feet.
Salm	Malta	8.2 bu.
Se	Japan	0.02451 acre.
Seer	India	2 2-35 lbs.
Shaku	Japan	11.9303 inches.
Sho	"	1.91 liq. quarts.
Skaipund	Sweden	0.937 lbs.
Stone	British	14 lbs.
Sun	Japan	1.193 inches.
Tael Kuping	China	575.64 grs. (troy)
Tan	Japan	0.25 acre